

EGU21-12162

<https://doi.org/10.5194/egusphere-egu21-12162>

EGU General Assembly 2021

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Sr-Nd-Pb isotopic significance of mantle source components from Central and Western Anatolia: Melting evidences from peridotite and pyroxenite source domains

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Extensive magmatic activities were developed in Central and Western Anatolia, since middle miocene to quaternary times, the most primitive lavas are situated in eastern end of Central (Sivas) and also western (Kula) Anatolia, besides Kula basalts are one of the most recent basaltic rocks together with basalts from south-central Anatolia. Although the magmatism is generally observed at several different locations, the recent basaltic rocks in both of the regions seem to be derived from the melting of the peridotite and pyroxenite source domains and the latter one was ignored in previous studies as source component.

The previous studies indicate that many of the basaltic rocks from Central and Western Anatolia are related with spinel-garnet transition, but typical Tb/Yb(N) (>1.8; [1]) and Zn/Fe (separates peridotite-derived (Zn/Fe <12; [2]) and pyroxenite-derived (Zn/Fe 13-20); [2] melts) Co/Fe ratios of the basaltic rocks from several volcanic centers from Central and Western Anatolia reveal that melting from the single source component are not solely capable of the producing basaltic rocks.

Sr-Nd and Pb isotopic compositions clearly display the distinction of samples which are linked to asthenospheric source. The lead isotopic systematic shows no significant differences among the Central and Western Anatolian basalts, of all the samples are above the NHRL line and close to EM II mantle component, Sr- Nd isotopes also display similar compositions as well, the majority of the samples are in and close to mantle array, but the Sr isotopic composition of Miocene aged Gediz and Simav lavas have high radiogenic values.

Tb/Yb(N), Zn/Fe ratios and as well as the Pb isotopic compositions and REE-based melting model reveal that Sivas, Erciyes Hasandağ, and Develidağ samples in central Anatolia, and Kula, Gediz basalt in western Anatolia seem to be derived from the amalgamated melting of pyroxenite and peridotite sources, besides, the sources melting is capable of the producing elemental variations in basaltic rocks related with either lithospheric delamination or lithospheric unstability

- 1.Wang et al., 2002, J.Geophys.Res.vol:107,ECV 5 1-21
- 2 .Le Roux, et al.,2011,EPSL, vol:307, 395-408

This study is financially supported by Hacettepe University, BAB project no: FHD-2018-17283